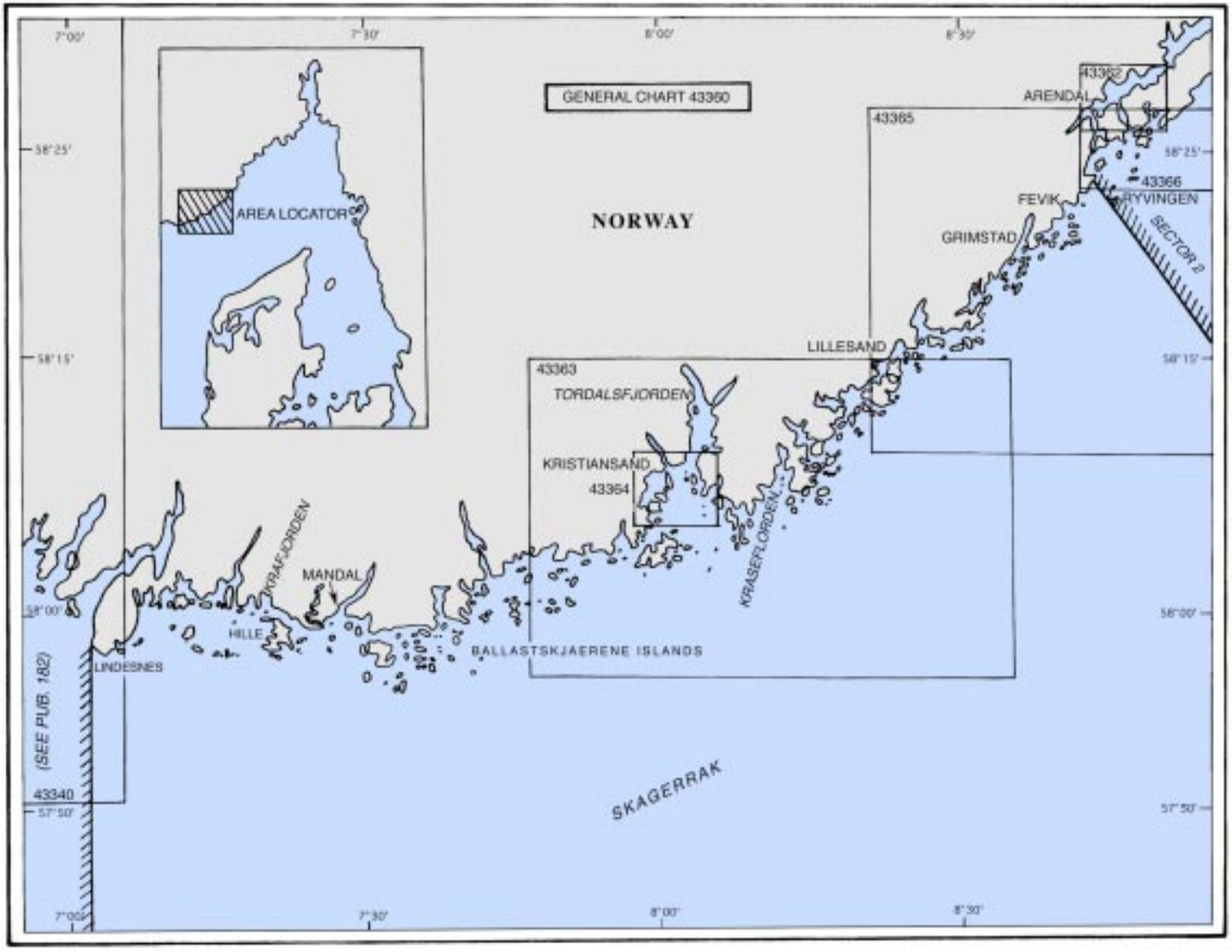


Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **1** — CHART INFORMATION

Table of Contents

SECTOR 1

NORWAY—SOUTHEAST COAST—LINDESNES TO ARENDAL

Plan.—This sector describes the SE coast of Norway between Lindesnes and Ryvingen, a small island located about 58 miles ENE. The description is SW to NE.

General Remarks

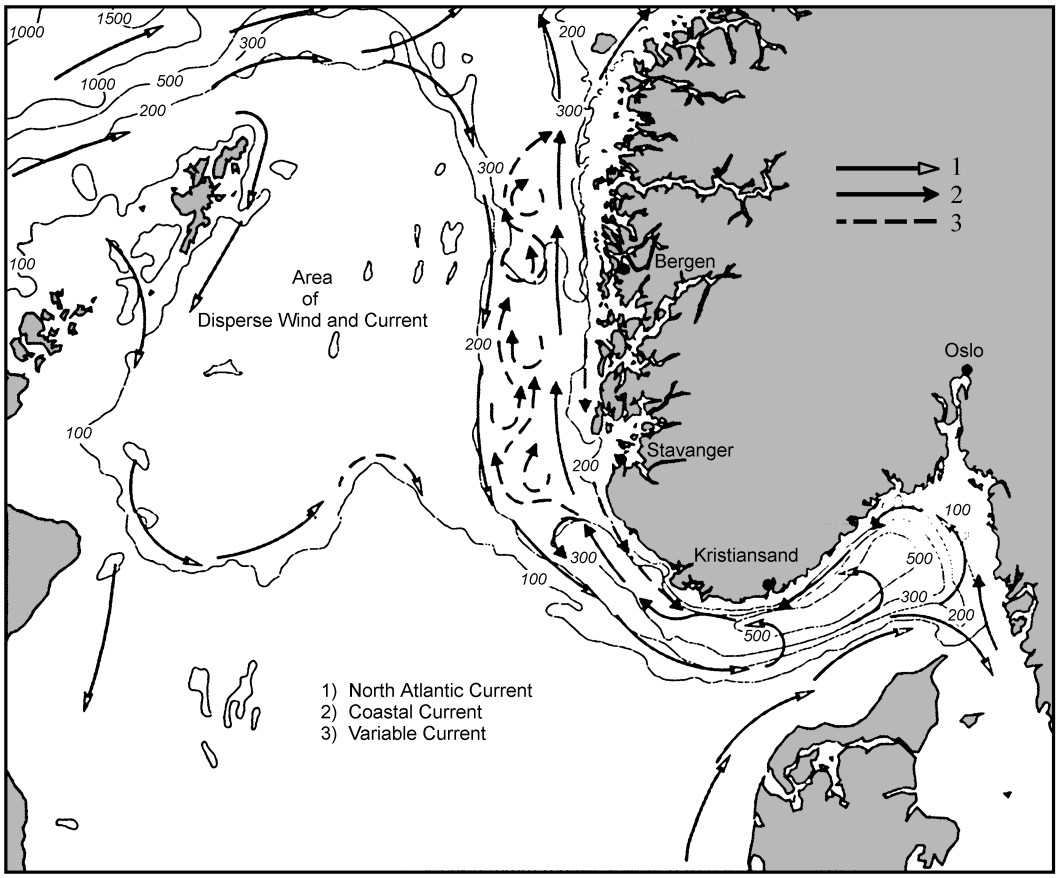
1.1 The SE coast of Norway, between Lindesnes and Arendal, has the same general features throughout; the coastline is quite irregular and much-indented; the hinterland is low-lying and generally featureless, and a multitude of off-lying awash and submerged dangers generally extend 5 miles offshore.

Natural landmarks and distinguishing features are few. Those more readily available to vessels standing off the coast are: Lindesnes, the mainland hill Halandsfjell (near Mandal); the light color of the offshore island Songvar; the mainland elevations Kristiansands Hoye land and Den Omvendte Bat (both near Kristiansand); as well as Homborsundsfall and Grimstadsalen (both near Grimstad).

An inner passage, available to small vessels with local knowledge, leads, for the greater part, between the mainland coast and the margin of off-lying islands. It is generally quite deep and well sheltered throughout, but is often very narrow and rather open to the effects of the sea, particularly in the area E of Lindesnes.

Navigation off the Norwegian coast is difficult and requires great caution. During the summer months, the long daylight hours and short duration of darkness provide a visual advantage to navigation in the region. In winter however, when the nights are proportionately long, the weather is mostly stormy and cloudy. Snowstorms often obscure the landmarks.

The coast is high and bold, with the exception of Lindesnes, and it is difficult to pick out natural landmarks. The landmarks given in this sector are conspicuous only from a particular direction and distance. They will be difficult for strangers to identify if the position of observation is not reasonably fixed; with the exception of **Udvare** (57˚59'N., 7˚13'E.) the islands of Skjaergarden tend to blend with the background.



SURFACE CURRENTS OFF NORWAY

Off the S and SE coasts of Norway, there is no continuous inshore route like Indreleia (inner leads) along the W coast. Small coasters navigate within the islands where the coast is not open, and these channels are generally too narrow and can be intricate to use by larger vessels, especially without a pilot. This part of the coast is considered to be one of the most exposed and navigational hazardous sections S of the Norwegian seaboard.

Ice.—Along the S coast of Norway, freezing starts earlier and with greater severity with increasing longitude. In January and February, ice normally forms in the inner leads, fjords, and several harbors along the coastal stretch from **Kristiansand** (58˚09'N., 8˚00'E.) to the **Swedish border** (59˚00'N., 11˚05'E.). This creates regular problems for the fishing fleet and smaller vessels. Some harbors to the E of **Jomfruland** (58˚51'N., 9˚36'E.), including Oslofjorden become dependent on local icebreaker service for shipping. Except during a severe winter, harbors in the vicinity of **Lindesnes** (57˚59'N., 7˚03'E.) are seldom ice-bound. Most harbors W of Jomfruland are ice free.

In some winters, the shipping route along Norway's S coast is hindered by drift ice. In addition, ice from the Kattegat drifts N with the current and adds to the problems of ice off the coasts of both Sweden and Norway. Such drift ice generally appears near the beginning of the year, however, seldom before Christmas.

Ice is present in the entrance to Oslofjorden as late as April and is common in March. The dates are difficult to predict as it is dependent on the state of ice in the Baltic; however, this ice is seldom a hindrance to navigation after February.

The inner channel to **Uddevalla** (58˚21'N., 11˚55'E.) is normally covered with frozen ice during February and March.

The formation of ice is influenced by winds from the NE or E; and its break-up and dispersal is caused by winds from the S or SW. Ice formation along the W coast of Sweden is unpredictable and treacherous due to the greater salinity of the Skagerrak compared with the low salinity of water flowing out of the Baltic Sea and local rivers.

The most critical months for ice formation are February and March as the sea is then at its coldest. Ice does not form during normal and mild winters along the W coast of Sweden. However, some ice will normally form in late January and persist until about mid-March. During severe winters ice may develop in late January and persist into late April. In the worst case the Kattegat and the E end of the Skagerrak may be frozen.

Tides—Currents.—Surface current off the S coast of Norway has large variations in the circulation system. There are two types of dominant water columns: the North Atlantic Current and the Norwegian Coastal Current, which is the strongest and most constant of the currents.

The North Atlantic Current, having a salt content of greater than 3.5%, emerges from between the **Faeroe** (62˚18'N., 7˚12'W.) and the **Shetland** (60˚20'N., 1˚30'W.) where one branch goes S along the W edge of the **Norskerenna** (Norwegian Trench) (57˚40'N., 7˚00'E.), having general depths of 275m to 640m. The N limit of the trench with depths of more than 200m lies about 5 miles off the coast of Norway. Atlantic water also flows N and S of Shetland and then flows S along the W side of the North Sea.

The excess fresh water from the Baltic Sea mixes with the salt water and is forced out through the Belts as the Baltic Current. This current then continues along Norway as the Norwegian Coastal Current. On its way the coastal current receives large amounts of fresh water run-off from Norway, and at the same time mixes with the saltier Atlantic Ocean water. As a rule, the interaction between high and low density water columns generates strong currents offshore, but the rates of 1-2 knots are not unusual. At a distance of 120 nautical miles off the coast, the current is hardly noticeable.

In heavy gales, the sea breaks over ground with depths of up to 37m, especially if the depth is great on the side from where the swell comes. A danger may often be detected by noticing a number of sea-birds, especially gulls, near the surface of the water, as they gather on shoals to catch small fish.

Regulations.—Speed is limited to 5 knots where the offshore depth is less than 100m, also in the areas near boat harbors, boats at anchor, etc.; and within 50m of public and private beaches. Public bathing places are marked by orange buoys (with an orange spherical topmark). Passing inside of these is prohibited.

Tankers.—Norwegian authorities recommend that tankers of 40,000 dwt and above, when navigating off the coast of Norway, should keep to seaward of a line joining the following positions:

a. 187˚, 13 miles from **Lindesnes Light** (57˚59'N., 7˚03'E.).

b. 180˚, 12 miles from **Ryvingen Light** (57˚58.1'N., 7˚29.5'E.).

c. 180˚, 15 miles from **Songvar Light** (58˚01'N., 7˚48'E.).

d. 146˚, 15 miles from **Oksoy Light** (58˚05'N., 8˚03'E.).

e. 156˚, 12 miles from **Svenner Light** (58˚58'N., 10˚09'E.).

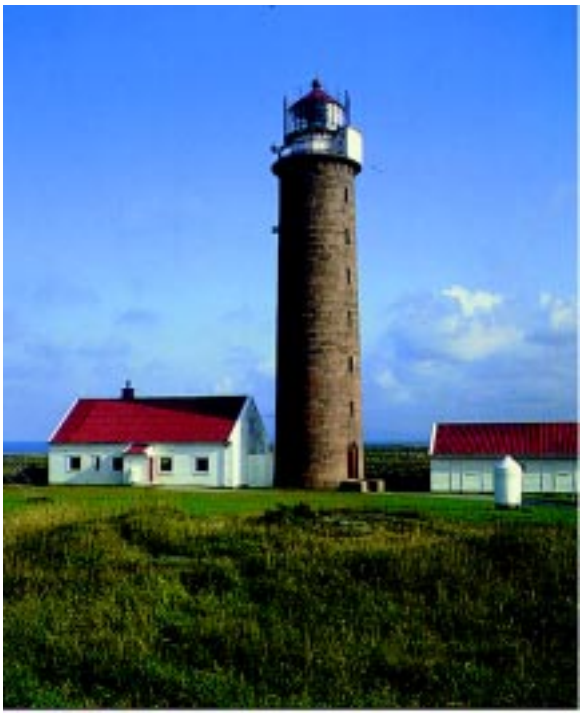
f. The SW end of the Traffic Separation Scheme for **Oslofjorden** (59˚00'N., 10˚35'E.).

Fishing.—Fishing is a year-round industrial activity with seasonal concentrations in various localities; most fishing is in coastal and fjord waters, but there has been a great extension seaward in recent years. The seasonal aspect is marked mostly in coastal waters and there may be large gatherings of vessels and much fishing gear. Vessels other than fishing should keep a safe distance when transiting through these areas and avoid the congested fishing harbors.

During the period of drift-net fishing for mackerel (May to July) all vessels, except those tankers stated above, are requested to keep 4 miles off the land.

Brisling (i.e., sprat or small herring) fishing is active closer inshore and, particularly, within the many inlets indenting the shoreline.

Mackerel fishing takes place in Skagerrak from the end of April until late summer by drift-net, purse-net, and trolling. The greatest concentration of drift-net vessels will be found in the area from Lillesand to Lista. Drift-nets may be up to 2 miles long. They are set at sundown and hauled early in the morning, they are marked by floats, and the end of the net is



LISTA LIGHTHOUSE

marked by buoys with flags and lights. Drift-net vessels often illuminate the net with a searchlight.

Purse-nets, marked by floats, are laid from the starboard side of the vessel, which proceeds in a circle and may occupy a considerable area; there may also be a boat with a towline up to 90m long from the vessel. A purse-net vessel exhibits, in addition to the lights prescribed by the International Regulations for Preventing Collisions at Sea, two yellow lights disposed vertically and flashing alternately.

Sprat fishing occurs from early June and throughout summer and autumn in the fjords of S Norway; Oslofjorden is considered a good area. Fishing is carried out mainly by purse-nets and partly by land nets. The catch from a purse-net is released into a tow net, which is then brought inshore and transferred to a land net.

Coalfish and tunny fishing take place off the coast from May until autumn. Purse-nets are used and may extend up to 146m.

Trawling is carried out mostly outside the fishery limits, but shrimp and float trawlers may be met inside them. When working in pairs at night, each trawler uses a searchlight trained in the direction of the other vessel.

Off-lying Dangers.—Along the S coast of Norway, there are several sections within which unusually rough seas often prevail. These sections are known as Dangerous Wave Areas and may be seen on the graphic. Extreme sea conditions and breaking surf have been observed, often in connection with the currents, in the vicinity of these areas.

Area 1.—Sletta (59˚29'N., 5˚10'E.) lies about 6 miles NW of Haugesund. In this area the depths vary greatly from shallow shoals to 250m. Very confused seas occur when the waves are from W to NW.

Area 2.—Skotamedgrunnen (58˚48'N., 05˚26'E.) is a dangerous area extending about 2 miles around a shoal in a SW-NW direction. The depths vary from 40m close W of the shoal to 16m E of it. Waves from SW to NW create heavy seas and breakers have been observed in this area.

Area 3.—Siragrunnen (58˚16'N., 06˚20'E.) lies off the channel to Ana-Sira, where the depths vary from 10 to 100m. Current conditions in the area are very variable. Farther offshore, the coastal current flows NE; however, between the shore and the coastal current, there is a counter-current flow.

The run-off at the entrance to Ana-Sira discharges at a maximum rate of 3 knots. This area should be avoided in bad weather. The SE wind over the variable S to NW current creates rough seas.

Area 4.—Listafjorden (58˚10'N., 06˚35'E.) lies at the entrance to a fjord gap, 1 mile wide, between Hidra and Varneset. Rough seas and swells break steeply from depths of about 300m onto the shore.

Area 5.—(58˚03'N., 06˚40'E.). The seabed slopes steeply along the 7 miles of coast at Lista, between Steinodden and Rauna. This causes wave refraction. Additionally, the current conditions vary with formations of eddies. The confused sea can be rough. Heavy breakers have also been observed in this area.

Area 6.—(57˚58'N., 07˚30'E.). The coastal current around Ryvingen lighthouse, off Mandal, normally runs W. Winds from SW to W, interact with the current and generate big seas and breakers in the area.

Area 7.— (57˚50'N., 6˚00'E. to 57˚40'N., 8˚30'E.). This is a large area lying in the NW part of the Skagerrak, off the S coast of Norway. Depths are mainly less than 100m with the exception of Norskerenna. The W coastal current dominates the current pattern. With waves from SW, several refraction centers are created off the coast (over Norskerenna) and, in addition, refractions are caused by the steep seabed near the shore. Interaction between waves and current leads to breakers.

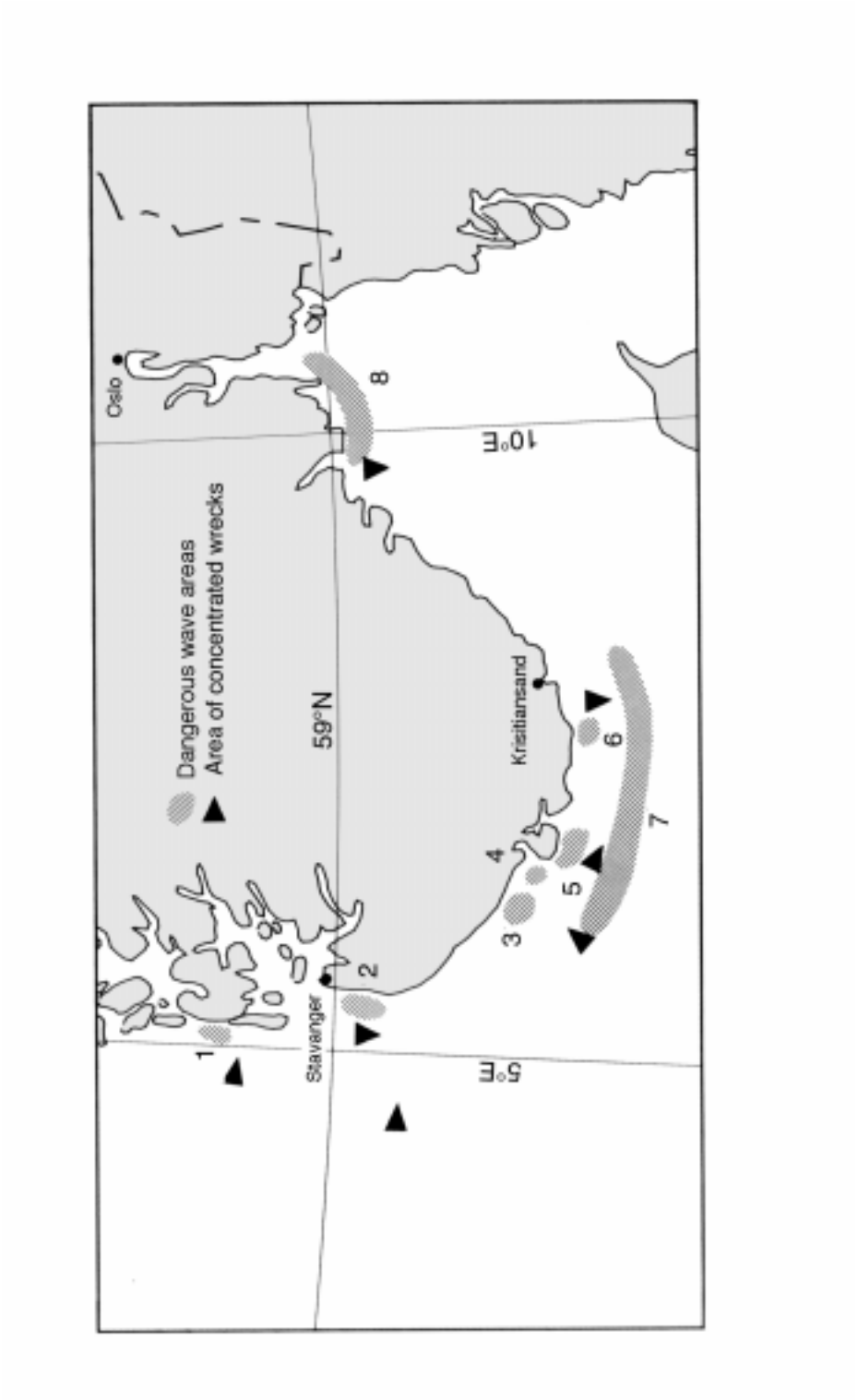
Area 8.—(59˚02'N., 10˚32'E. to 58˚57'N., 09˚45'E.). The area extends from Fider (Faerder) to Hvasser/Tjome, past Svenner to Tvistein Lighthouse. The waters are 50 to 100m deep, interspersed by a number of shoals. The W current in the area is independent of the tide and has a rate of 1 to 1.5 knots. There are several refraction centers in this area with winds from SW to SE. Winds from SE to SW create the roughest seas and heavy breakers in the E part of the area. The sea is described as rough and recoiling from all directions. Waves from SW break heavily in the W part of the area.

Pilotage is not compulsory for the coastal passage but can be arranged, if needed, through Sogndal or Kristiansand Pilot Stations.

Directions.—Traffic lanes have been established off certain parts of the S and SE coasts of Norway; these are shown on the charts. Use of the lanes is not compulsory, but in the interest of safety all through traffic is recommended to use them.

The coastal route, which passes outside the 200m contour, leads E, then ENE, clear of dangers.

Caution.—The seaway in and around Kristiansandsfjorden is the site of both several overlapping firing areas and a restricted area, in which navigation is controlled by regulation.



DANGEROUS WAVE AREAS OFF THE NORWEGIAN COAST

Certain areas within the Sorlandet Maritime Defense District are prohibited to navigation. These areas generally lie within 50m of the shore around **Hisoy** (58˚26'N., 8˚46'E.), **Kristiansand** (58˚09'N., 8˚00'E.), and **Mandal** (58˚02'N., 7˚28'E.). However, details of the limits should be obtained locally. Photography is also prohibited. For further detail see Pub. 140, Sailing Directions (Planning Guide)North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Sea waves are generated locally by the wind and can vary in direction. Some of the roughest seas are experienced when a vigorous secondary depression develops in the Skagerrak or W of the area. Strong to gale force winds generated between SW and NW are not unusual. In the many inlets and fjords, the seas are generally less than they are over open water. Although, where there is a funneling of the wind, the seas may be higher than expected.

Lindesnes to Kristiansandsfjorden

1.2 The coastline between Lindesnes and Kristiansandsfjorden, about 30 miles ENE, is irregular and much indented by an uninterrupted series of coves, small bays, and long, narrow, winding inlets.

Inland, the terrain consists of a succession of low, rocky hills and rolling plains, somewhat forested but barren for the most part, which continue in from the sea about 10 miles before rising steeply to interior highlands and mountains.

Offshore, the coastline is fronted by many forested islands, barren islets and scattered awash and submerged rocks, generally extending seaward between 3 to 5 miles.

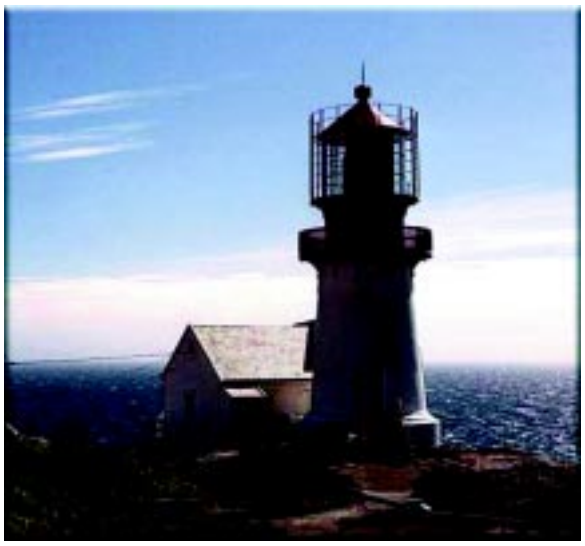
In appearance, they tend to merge with the mainland in the background and produce a combined effect which offers few distinguishing features except for the mainland point Lindesnes; the off-lying island Udvare; the comparatively high hills of the large island Skjernoya; the lighter coloring of the island Songvar; and the higher or more conspicuous mainland elevations Hovenuten, Halandsfjell and Eidsveten.

Offshore and inshore depths are considerable. The 200m curve lies, in general, some 1 to 3 miles S of off-lying dangers, save between Ryvingen and Ballastskjaerene, where it closes to a distance of less than 1 mile.

The coast between Lindesnes and Tanes, a mainland point about 19 miles to the E, is considered one of the most exposed stretches of the Norwegian seaboard and is reported to be one of the most hazardous to navigation.

1.3 **Lindesnes** (57˚59'N., 7˚03'E.), the S most extremity of the Norwegian mainland and an important landfall for vessels entering the Skagerrak from N or W, is a bluff, reddish-brown rocky headland rising abruptly to a height of 40m. It falls steep-to into depths that increase rapidly seaward and thus preclude sounding as an adequate indication of distance off when passing over the off-lying banks Lamekletten and Neskletten. The sea breaks on Neskletten during bad weather.

The land in the vicinity of Lindesnes is bold, rugged, and moderately high but difficult to differentiate when seen from offshore, because the natural landmarks do not particularly stand out, but merge with one another. On closer approach, however, the white lighthouse standing on the headland becomes conspicuous. Inland, the peninsula behind Lindesnes rises to several prominent peaks and to high lands. These are generally covered with snow and are visible during clear weather, in spring, from a distance of 30 to 40 miles.



LINDESNES LIGHTHOUSE

LINDESNES LIGHTHOUSE (57˚09.0'N., 07˚02.9'E.)

The more prominent peaks behind Lindesnes are: Neskongane (58˚00'N., 7˚05'E.), several knolls rising to 89m; Skipmannsheia, 153m high; and Presthusveten (58˚03'N., 7˚07'E.), 185m high.

1.4 **Udvare** (57˚59'N., 7˚13'E.) is a small uninhabited rocky island lying about 5 miles E of Lindesnes; it is reported to be radar conspicuous at a distance of 6 miles. Vare, about 1 mile N of Udvare, is the largest of a group of nearby islets and rocks, and together with Udvare forms a gray, barren, but rugged island group rising to the same height as the mainland. This group resembles a lofty promontory until approached close enough for the intervening channels to be distinguished.

Off-lying dangers.—Neskletten (57˚58'N., 7˚02'E.), a bank with a least depth of 25m, lies with its N extremity 1 mile S of **Lindesnes Light** (57˚59'N., 7˚03'E.). The sea sometimes breaks on this bank.

Gjeslingane (57˚58'N., 7˚12'E.), situated at the NW end of a group of submerged rocks, 5 miles ESE of Lindesnes and 1 mile S of Udvare, consists of two awash rocks. These two rocks constantly break. Kletten, with a least depth of 8m, lies at the S end of this group, 2 miles S of Udvare.

Langebaene (57˚59'N., 7˚09'E.), about half-way between Lindesnes and Udvare, consists of numerous dangers and several awash rocks grouped around a small central area which dries.

The sea area to the N, extending between Udvare and Vare; and the peninsular mainland on the W, is largely obstructed by a scattering of several smaller islands, numerous islets and a multitude of awash and submerged rocks, the positions of which can best be seen on the chart.

Anchorage.—Ramslandsvagen (58˚02'N., 7˚07'E.), a small inlet entered about 3 miles NNE of Lindesnes, affords anchorage close to the W shore 0.6 mile within the entrance, in a depth of 16m, sand and clay. The entrance to the inlet is encumbered by reefs and islets; local knowledge is required. In a NW wind there can be choppy sea on the bay and in the adjacent waters.

Njervefjorden (58˚02'N., 7˚10'E.), about 1.25 miles ENE of Ramslandsvagen, lies between Nyrsnes and Imsa. Small vessels, with local knowledge, can anchor in 16m at a position about halfway within the cove fronting Bali, on the NW side of the fjord.

Remesfjorden, separated from Njervefjorden by Imsa, is the first sheltered inlet E of Lindesnes. The two principal entrances are N of Imsa from Njervefjorden, and between Imsa and an island 0.25 mile E. Vessels of moderate size may anchor close SW of a cove on the NE side of the fjord, 0.5 mile NNE of Imsa, in a depth of 35m, clay. Care is necessary to avoid two rocks, awash, close NW of the anchorage. Small vessels may anchor within the cove in 5.5 to 9.2m, mud.

Anchorage.—Vare provides good anchorage for small vessels, with local knowledge; about 1 mile N of Udvare, in a depth of 32m, sand. The approach to the anchorage is intricate.

1.5 Hille (58˚00'N., 7˚22'E.), a relatively large island rising to a height of 98m near its center, lies 4.5 miles ENE of Udvare. The water between these two islands is roomy, rather open, and comparatively clear of awash and submerged rocks. Tvisteinen, nearly 3 miles E of Udvare, the farthest seaward danger, is a precipitous reef surmounted by a partially awash rock, that is occasionally marked by breakers, with winds from the S and SW. Groningbaen, a rock lying about 1.5 miles E of Vare, is unmarked by breakers save in a heavy sea. East of a line joining Tvisteinen and Groningbaen and extending to Hille are many scattered islets and rocks whose positions can best be seen on the chart.

Syrdalsfjorden (58˚02'N., 7˚15'E.), a foul, rock encumbered inlet, is entered between Svinoy and Groningen, about 3 miles NNE of Udvare. Uderoy, an island, forms the E side of Syrdalsfjorden, and separates it from Sniksfjorden, a narrow inlet with a channel 3m deep near its entrance.

Landmarks conspicuous on this part of the coast are Hovenuten, 209m high, located 3.5 miles NE of Svinoy and Skeggestadheia, 202m high, located 2 miles ESE of Hovenuten.

Anchorage.—Syrdalsfjorden has several anchorages. Breidvika, in the SE part of Syrdalsfjorden, has temporary anchorage for large vessels in 20 to 30m, in a position with the SE extremity of Udvare and the W extremity of Groningen in range 199˚, and with the 35m elevation in the S part of Uderoy bearing 120˚. Near the head of Syrdalsfjorden vessels can anchor close W of Furuholmen in 29 to 38m, clay.

The basin between Groningen and the SW part of Uderoy has good anchorage for small vessels in 15 to 17m; it is not protected from strong gusts of S winds.

Kvafjorden (58˚02'N., 7˚20'E.), entered close NNW of Hille, has good anchorage throughout the area N and clear of Fjordbaen, a rock with a depth of 10m. Small vessels may anchor in 21 to 34m close N of Tartholmen, or in 6 to 17m near the head of the inlet Lundevik. Sugga, an awash rock, lies near the head of Kvafjorden; medium sized vessels anchor in 14 to 30m in a position close SW of the rock.

1.6 Lille Kraka (58˚01'N., 7˚19'E.), lies 0.55 mile WNW of Hille; it is an awash rock marked by a cairn. Vessels approaching Kvafjorden from the W, and having arrived in a position N of the islet **Hummerholmen** (58˚01'N., 7˚16'E.) steer for the light on the islet Gjallarasholmen on a heading of 081˚; this track leads close S of the awash rock Follet, which lies about 0.4 mile WNW of Lille Kraka. When the vessel has cleared Lille Kraka, steer a N course and pass between Lindholmen and the mainland to the W, and enter Kvafjorden.

When approaching Kvafjorden from the S, pass on either side of Tvisteinen, then either W of Hjorteskjer or E of **Hjorten** (58˚00'N., 7˚19'E.). Taking care to avoid the dangers S of Hjorten and NNW of Hjorteskjer; a rock with a depth of 7.5m lies 0.2 mile SE of Hjorten. When the vessel is clear of Hjorten, steer so as to proceed W of the 17m rock Sondre Klovholmbaen, E of Store Kraka, W of the off-lying islet Runkelholmen and E of Lille Kraka, where they join the W approach track and continue as described above.

Anchorage.—Hillesund (58˚01'N., 7˚21'E.), a small community on the NE side of Hille, fronts a water area which has good but temporary anchorage for small vessels. Vessels anchor between Hille and the NW extremity of Nakkoy in depths of 20 to 34m.

Lederkilen (58˚00'N., 7˚21'E.), the water area between the SW side of Hille and the off-lying islet Ledervikholmen, has sheltered anchorage for small vessels, in a depth of 12m; the vessel should have a stern hawser ready to be sent ashore.

Hillevagen (58˚00'N., 7˚22'E.), an inlet on the SE side of Hille, has anchorage for small vessels in 16 to 20m, good holding ground but with limited swinging room.

Vessels approach Hillevagen from the SE through Tungefjorden. Steer to pass between the SE extremity of Hille and the off-lying island Steinsoy. Then steer NNW, passing E of a rock with a depth of 10m and a rock with a depth of 17m close N. There is a line of dangers about 0.15 mile E of the 17m rock, whose positions may best be seen on the chart.

Hillesundet (58˚01'N., 7˚23'E.), formed between Hille and the mainland, is a narrow encumbered passage which is available, for the most part, to small vessels with local knowledge.

Dorje, in the SE part of the passage, has temporary anchorage for small vessels in 25 to 27m.

1.7 Mannefjorden (57˚59'N., 7˚28'E.), about 13 miles E of Lindesnes, is a deep somewhat narrow sea area, which provides relatively clear access to the river Mandalselva and the community Mandal; along with Kleven and other surrounding dependencies. It is entered between Steinsbaane, on the W, and the prominent rocky island Ryvingen on the E.

RYVINGEN LIGHTHOUSE (57˚58.1'N., 07˚29.1'E.)

Ryvingen Light (57˚58'N., 7˚29.5'E.) is shown from a 22.5m high red tower with a white band. A submarine cable is laid from a cove on the SE side of Ryvingen N and NNE for 1.25 miles to the head of an inlet on the SW side of Skjernoy.

Hjelmen and Eigelandskjaer, two small islets, lie close N of Ryvingen, and are conspicuous by reason of their dark brown color. Similarly a strip of sandy beach W of the entrance to Mandalselva is visible for a considerable distance because of its bright yellow color.

The low hills Kalven and Kua (119m high) lie about 1 mile E of Mandalselva, are conspicuous because of their haystack form, but are obscured to vessels proceeding from Lindesnes by the high hills on Hille.

HATTHOLMANE LIGHTHOUSE (58˚00.2'N., 07˚27.0'E.)

There are several approaches from sea through Mannefjorden and its adjacent waters to inner anchorages and the facilities at Mandal. The S, or principal approach, used by deep draft vessels, leads N through Mannefjorden, E of **Hattholmane** (58˚00'N., 7˚27'E.) and then to Mandalselva.

Mandalselva has a continuous outflow which creates eddies W of the river mouth. The strongest eddies are in the shallow narrows between Aspholmen and the mainland opposite; they are remarkable as far as Hattholmane, 0.45 mile S.

A submarine cable, which may best be seen on the chart, is laid between 0stre Hattholmen and the mainland 0.25 mile NW of Aspholmen.

Anchorage.—Large vessels may anchor in 9 to 11m, with the light on Hattholmane bearing 171˚, 0.3 mile distant, and Kleven Front Range Light bearing 054˚. Vessels should avoid the rock about 0.2 mile NNE of the anchorage, which has a depth of 6m; the rock is marked by a buoy. There is good anchorage for small vessels, with local knowledge, 0.75 mile NW of Hattholmane, in 12m, sand. A submerged rock with a depth of 4.3m, lies about 206m E of the anchorage.

The basin fronting Kleven has anchorage for small vessels in 31m, mud, but the swinging room is limited and vessels should moor with the stern made fast to mooring rings ashore.

1.8 Stutsoy (58˚00'N., 7˚29'E.) lies on the W side of the SE approach, 0.3 mile NNW of Faeroy. A beacon is situated on Kalkskajaer, close E of the S extremity of Stutsoy.

Vestre Brattholmen and Ostre Brattholmen lie close off the N end of Stutsoy. Moldskjera, close N of Vestre Brattholmen, is a group of awash rocks lying on foul ground extending from the SE end of Gismeroy.

Ellingstonnene (58˚01'N., 7˚30'E.), a rock, lies on the E side of the channel, about 0.2 mile ENE of Moldskjera; it is marked by a tower-beacon.

Kuboen, lying in mid-channel 0.3 mile NW of Ellingstonnene, has been dredged to a depth of 10m. A depth of 7.2m lies close E of Kuboen.

Vessels approaching Kleven should use the S approach from Mannefjorden to Faeroysundet. Steer so as to pass along the NW side of Hjelmenskjaera, 0.5 mile N of Ryvingen, in the white sector of Madodden Light bearing between 032˚ and 036˚, passing between Faeroy and Faeroyboane; this track leads close NW of a 2.3m depth.

When in the N part of Faeroysundet, keep on the dividing line of the green and red sectors of Madodden Light, bearing 175˚ astern, which leads out of the channel and E of Stutsoy. Continue on course 355˚ and bring Kleven range lights into line bearing 324˚, which leads through the fairway to the anchorage.

Mandal (58˚02'N., 7˚28'E.)

World Port Index No. 23530

1.9 Mandal is the S most town in Norway. It stands at the foot of a low hill on the W bank of the entrance to the Mandalselva River. This river flows into the head of Mannefjorden. The main commercial facilities of the port are situated at Kleven and Gismeroya, which are located close E of the town and connected by a bridge.

Depths—Limitations.—The entrance to the river is dredged to a depth of 4.5m over a width of only 20m. In SE strong winds, entry into the river can be impossible. The berths fronting the banks have depths of 2 to 4m alongside. A bridge, with a vertical clearance of 3.5m, spans the river, 0.6 mile above the mouth.

Kleven is a good harbor in all weather conditions. The main quay is 100m long with a depth of 8m alongside. There is also about 160m of berthage with depths of 3.5 to 4m alongside.

The quay at Gismeroya is 170m long with a depth of 10.5m alongside. Vessels up to 75,000 dwt, 200m in length, and 10m draft have been accommodated.

There is also an oil fuelling installation at Homsvik (58˚00.4'N., 7˚30.0'E.). It has depths of 13 to 19m alongside and can accommodate tankers up to 50,000 dwt.

Water levels fluctuate primarily due to meteorological conditions since tidal action is generally very slight or lacking altogether. Currents within the river reach a velocity of several knots but become insignificant well outside. Ice is seldom a hindrance. There are speed restrictions in the fjord and harbor.

At the head of the fjord, a conspicuous yellow and sandy beach extends about 750m WSW from the vicinity of the river mouth.

Pilotage.—Pilotage is compulsory in the harbor for vessels over 100 grt. Vessels bound for the harbor should request pilots from Kristiansand. Harbor pilots usually board SE of Oksoy (58˚03'N., 8˚07'E.) for vessels approaching from E, and SW of Sogndalsstrana (58˚18'N., 6˚14'E.) for vessels approaching from W. Vessels should request pilotage 24 hours in advance.

The shoreline between Mannefjorden and Tanes, a point about 6 miles to the E, is quite regular with the exception of Hartmarkfjorden, which indents the coast for a distance of about 2 miles. A group of islets and rocks extend about 3 miles seaward, E of Skjernoy. **Oddknuppen** (57˚58'N., 7˚34'E.) is the farthest seaward of this group of rocks; it is marked by a light. **Gasekjaerene** (57˚58'N., 7˚39'E.), about 2.5 miles ENE of Oddknuppen, is a group of awash and submerged rocks.

Tregde (58˚01'N., 7˚34'E.), about 3.5 miles ESE of Mandal, is a small mainland community fronting on the deep islet sheltered basin Tregefjorden. It may be approached by small vessels, with local knowledge, through a number of deep, intricate channels, leading through the rocks and islets.

Tanes (58˚01'N., 7˚40'E.), 3.5 miles E of Tregde, is marked by a cairn; a light stands close offshore, SE of the cairn. The point is low, but is backed by Eidsveten, a conspicuous hill 130m high, situated 1.5 miles NNW of the cairn.

1.10 Tanes to Kristiansandsfjorden.—The coastline between Tanes and Kristiansandsfjorden, about 9 miles, is irregular and indented by an uninterrupted series of deep, and often quite narrow, inlets.

Offshore the open sea area is choked by numerous low-lying islands and islets and obstructed by a multitude of scattered rocks and other awash and submerged dangers which open partially to form the deep, relatively clear body of water, Songvarfjorden. Soundings are of little use when approaching this typical skjaergard from sea because depths are great and dangers rise steep-to.

Ballastskjaerene (57˚58'N., 7˚41'E.), about 2.25 miles SSE of Tanes, comprises a number of awash and submerged dangers of which Vestre Ballastskjaer, the farthest SW, is a dark, awash rock marked by a conspicuous light- structure. The island group Udvar and the islands grouped around Songvar lie seaward of Songvarfjorden.

The submerged rock Hanegalsbaen, with its surrounding submerged dangers, lies E of Songvarfjorden and in the W approaches to Kristiansandsfjorden. All known off-lying dangers lie inshore of a line joining Ballastskjaerene and Hanegalsbaen.

Numerous passages entered from sea lead through off-lying dangers to the many inlets indenting the coastline. The passage farthest W leads W of **Vestre Ballastskjaer** (57˚58'N., 7˚41'E.), proceeds E of Tanes and the inlet Dalskilen, W of the island group Vassoyane, E of the inlet Komlefjorden and continues N into the inlet Hundskilen. The next passage E proceeds between Vassoyane and **Udvar** (58˚01'N., 7˚44'E.) and then branches either N and E of Udvar or continues N to the inlet Trysfjorden. The third passage proceeds E of Udvar and then either continues N to the inlets Hallandsvik and Torvefjorden or branches E through Songvarfjorden. The fourth passage proceeds through the islands grouped around Songvar and then either continues N to the inlet off the community Hollen or branches E to the harbor Ny-Hellesund. Several additional passages lead to Ny-Hellesund from the S, SE, and E.

An inner passage, recommended only for vessels with local knowledge, proceeds E from Tanes, N of Udvar and through Songvarfjorden to a position SE of the islet Varholmen then leads either through Ny-Hellesund or the narrow, 10m deep passage N of the island Monsoy, where it continues S of the islet Heroy and N of the islet Kjamsoy.

Anchorage.—Komlefjorden (58˚03'N., 7˚40'E.) has good anchorage, with mooring rings, in depths of 40 to 50m good holding ground, on the SW side of the inlet, with the summit of **Store Gjave** (58˚01'N., 7˚46'E.) bearing 111˚. When approaching the anchorage, take care to avoid a reef extending from the NE shore, 0.3 mile within the entrance. A 15m reef lies in the middle of the entrance to the fjord.

Trysfjorden (58˚04'N., 7˚42'E.), entered about 3 miles NNE of Tanes, although with a restricted passage, is navigable by small vessels as far as Try. The narrows near Skarpeid, 1.25 miles within the entrance, has a depth of 4.7m, and is spanned by a bridge with a 16m vertical clearance beneath its center. An overhead cable near the bridge has a clearance of 14m. Timber is shipped from Try where there are some small quays.

Torvefjorden (58˚04'N., 7˚47'E.) affords anchorage near its head in a depth of up to 20m, mud. The anchorage is approached W of a chain of awash and submerged rocks which extend 0.4 mile NNE from the middle of the entrance, and E of a rock 183m off the W shore of the fjord.

1.11 Hollen (58˚05'N., 7˚49'E.) situated about 6 miles ENE of Tanes, is a small summer resort lying on the W side of the mouth of the river Sogneelva; It has a small artificial harbor which is dredged to a depth of 4m. The outer quay is 152m in length with a depth alongside of 4m; a small stone quay within it has a depth of 3m alongside. The outer harbor is foul and

should not be approached without local knowledge. It has a snug harbor with good holding ground in a depth of 19 to 26m, which is used by larger vessels when handling cargo. The anchorage is also used for laying up vessels.

Directions.—The numerous passages from sea through off-lying dangers to sheltered mainland anchorages are, in general, quite deep but recommended only for vessels with local knowledge.

Ny-Hellesund (58˚03'N., 7˚51'E.), about 6 miles ENE of Tanes, is a narrow, sheltered channel which, leading through the islands of Monsoy, Kabeloy, and Helleoy, commonly lends its name in description of the several anchorages among the numerous islands grouped in the vicinity of Monsoy, the largest island in the area. The channel has general depths of 17 to 18m, sand, throughout except the W entrance where the least depth is 5.5m between Monsoy and Kabeloy and in the NE entrance where the least depth is 7.5m between Gretesteinen, a small, awash rock on the E side of the fairway, and Signalskjaergrunnen, an area of foul ground on the W side. An overhead cable, which spans the narrowest part of the channel between Kabeloy and Monsoy, has a vertical clearance of 29m. Currents usually set W, and though at times they may become remarkable in the narrower reaches, they seldom hinder navigation. The NE entrance is often iced over during severe winters, but Olavsund, the shoal encumbered S entrance between Kabeloy and Helleoy, is generally ice free. There is a speed limit of 5 knots in Ny-Hellesund.

Ny-Hellesund is suitable for vessels with a draft not exceeding 4m; it should not be approached without local knowledge.

Anchorage.—A lighthouse is situated on the W extremity of Kabeloy. Small vessels may anchor 183m N of the light-tower in depths of 30 to 40m; a submarine power cable extends across the channel close E of the anchorage, it must be avoided.

Anchorage may also be taken about 0.3 mile W of the lighthouse, between Langoy and Skarpoy. Care must be taken to avoid a rock, marked by an iron perch, close off Langoy. Vessels can anchor N of Skarpoy, about 0.25 mile distant, in a depth of 40 to 45m, sand and clay. The 24m sounding within the anchorage area lies over a rocky bottom.

Kusevikfjorden (58˚05'N., 7˚51'E.), a small bay about 1.25 miles N of Ny-Hellesund, is considered the best anchorage in the area, although free access is largely restricted by numerous awash and submerged dangers. Only small vessels with local knowledge should attempt entry.

Directions.—The principal approaches to Ny-Hellesund are from the W through Songvarforden, S from the sea, and SE through the off-lying awash and submerged rocks. Only the S approach will be discussed here.

Vessels bound for the passage W of **Skarvoy** (58˚03'N., 7˚50'E.) and having arrived in a position E of **Hellersoyskjaer** (58˚01'N., 7˚49'E.), a partially awash reef close SE of Hellersoy, proceed on a N course and pass E of Ytre Songvarbaen, 0.5 mile NE of Hellersoyskjaer, and E of Kniven, 0.6 mile farther N. When the vessel is clear of Kniven steer to pass between Skarvoy and Skarvoybaen, a submerged rock 0.25 SW. Then steer through the narrow channel between the SW side of Kabeloy and a submerged rock lying off the E extremity of Langoy. Proceed to desired anchorage.

Kristiansandsfjorden

1.12 Kristiansandsfjorden (58˚06'N., 8˚02'E.), about 33 miles ENE of Lindesnes, is the first major fjord or inlet to indent the S coast of Norway. When reckoning from the landfall at Lindesnes, and is the principal maritime approach to the harbor for Kristiansand, the largest port in the S extremity of the country. The inlet continues several miles to the N. The terrain surrounding the inlet is relatively level to rolling and consists, in general, of bare, dark gray stone slopes alternating with forested hillocks. The inlet is commonly deep throughout and, with depths in the middle portion ranging to well over 200m, is able to accommodate vessels with the deepest draft. Ytre Flekkeroy and the multitude of awash and submerged dangers fronting its S and SE sides lie on the W side of the seaward entrance to the inlet and restrict the more frequently used access to passages leading E and W of the island. A less frequently used access leads through the several islands on the E side of the seaward entrance.

In general, as is common along this coast, Kristiansandsfjorden is difficult to make out from sea since off-lying islands and islets tend to merge with the forested hills of the mainland background. Of those landmarks which tend to identify the inlet, the more distinguishing are:

Kristiansands Hoye Land (58˚19'N., 7˚45'E.), about 13 miles NNW of Kristiansand, is an uncharted mountain ridge which, rising to two unequal humps, slopes gradually to the E and, from the higher of the two humps, falls off abruptly to the W. It is one of the first landmarks made out when approaching the coast because it is both distinguishable from surrounding mountain features, due to its distinctive bluish color, and, in clear weather, because it is often visible at a distance of about 30 miles.

Den Omvedte Bat (meaning The Overturned Boat), about 2.5 miles NNW of Kristiansand, is a hill having the appearance of the bottom of a capsized boat. It and Kristiansands Hoye Land are often useful in obtaining cross bearings.

A smelting works at Fiska, about 1.25 miles SW of Kristiansand, emits smoke which is often visible seaward well before other landmarks can be made out.

Pilotage.—Pilotage is compulsory for non-military vessels of 50 grt or over when in transit of waters within the restricted area fronting Kristiansandsfjorden. Vessels must have an authorized pilot on board or, when weather conditions preclude this, must follow pilot directions from an accompanying pilot vessel. They may not navigate in any channel other than that leading from E of Ytre Flekkeroy to Kristiansand or Tovdalsfjorden.

Pilots embark 2.5 miles ESE of **Oksoy** (58˚04'N., 8˚04'E.), but must be ordered through the pilot office in Kristiansand. The vessel should advise the pilot office of ETA at least 24 hours before arrival and again in confirmation 2 hours before arrival.

ODDEROYA LIGHTHOUSE (58˚07.8'N., 08˚00.5'E.)

Vessels board pilots in a position about 1.5 miles ESE of Oksoy, a barren, low-lying island E of Ytre Flekkeroy. They advise pilot office of ETA at least 24 hours before arrival and again in confirmation 2 hours before arrival. They may contact the pilot vessel directly on VHF channel 16 or by radiotelephone.

OKSOY LIGHTHOUSE FROM SE

Harbor pilots are available, though not required. They board near **Odderoya** (58˚08'N., 8˚00'E.).

Caution.—A restricted area, in which navigation is controlled by regulation, fronts Kristiansandsfjorden and adjacent waters within limits defined by a line joining positions in **Arosveten** (58˚04'N., 7˚50'E.), **Hellersoy** (58˚01'N., 7˚49'E.), **Lille Svarten** (58˚03'N., 8˚01'E.), **Meholmskjaer** (58˚06'N., 8˚12'E.), **Langbaen** (58˚07'N., 8˚15'E.), and **Krygholmen** (58˚07'N., 8˚14'E.).

Tides—Currents.—A prevailing W setting coastal current enters Kristiansandsfjorden through the SE approach, passes N of Ytre Flekkeroy and exits through the SW approach. Concurrently, fresh water discharged into Tovdalsfjorden and the upper reaches of Kristiansandsfjorden first set S then, deflected by its encounter with the coastal current, similarly exit through the SW approach. Thus, currents are generally stronger in the SW approach than in the SE approach and may reach a velocity of 3 knots, particularly during periods of fresh water run-off caused by rain or melting snow.

Vestregapet (58˚04'N., 7˚57'E.), the SW approach to Kristiansandsfjorden, is formed between the SW side of Ytre Flekkeroy and the numerous rocks and islets lying SSW of Indre Flekkeroy. Flekkeroygapet, the continuation of Vestregapet, is a narrow passage between Ytre Flekkeroy and the irregularly formed mainland peninsula Indre Flekkeroy, then it joins the SE approach through Kristiansandsfjorden.

Flekkeroygapet has a least width of 0.25 mile but is reduced somewhat by the dangers off-lying each side of the fairway. This passage should not be used by large vessels.

Svensheia (58˚05'N., 7˚55'E.), 118m high, stands on the W side of Vestregapet and Veten. Vestregapet and Veten, about 1.25 miles ENE, are conspicuous. Tonden, 0.8 mile NNE of Veten, is a 96m high barren hill, remarkable for its distinctive rocky knob summit which rises above the surrounding hills.

A prohibited anchorage area lies in Flekkeroygapet and includes all waters between the SW entrance and the islet Gamleoy, including Hellevika but not including Fossevika and Kjaerskilen.

1.13 Anchorage.—Store Lyngholme (58˚03'N., 7˚55'E.), an island on the W side of Vestregapet, has temporary anchorage in 12 to 18m, sand, in a position between the N side of the island and the S side of the islet Guleholmen.

Sandvikdalsfjorden, entered 1 mile N of Store Lyngholmen, has several coves on its W side where small vessels anchor temporarily; local knowledge is required and attention is directed to S winds which send in a heavy swell. Romsvika on the SW side of the fjord has anchorage in 20m, with mooring rings ashore. Svensvika has anchorage in 9m, clay, close within its entrance; strong gusts occur with W and NW winds. Kjuvika has indifferent anchorage.

An anchorage, open to W winds, may be taken by small vessels in Biskophamn located on the SW coast of Ytre Flekkeroy.

Kjaerskilen, an inlet on the NW side of Ytre Flekkeroy, has good anchorage in 30 to 44m close within its entrance. Farther in are several concrete quays with depths of 3 to 12m alongside.

Lindebokilen, E of Gamleoy, has anchorage in 12 to 17m. Care must be taken to avoid the submarine cables and a pipeline which extends NNW across Flekkeroygapet to Indre Flekkeroy. Inside the inlet are several berthing facilities with 1.5 to 7m alongside.

Flekkholmsundet (58˚05'N., 8˚00'E.), the narrow strait between Ytre Flekkeroy and the islet Flekkholmen, has anchorage in the W entrance in a depth of 23m; there are mooring rings ashore. An overhead cable with a vertical clearance of 15m spans the channel close E of the anchorage.

A submerged rock with a depth of 5m lies in the middle of the narrowest point of Flekkholmsundet, further constricting the passage.

Fossevika, an inlet on the SE side of Indre Flekkeroy, and close within the S entrance to Flekkeroygapet, has good

anchorage in a position close within the entrance in a depth of 14m. An anchorage in 17m, clay, is available near the head of the inlet.

Indre Flekkeroyhavn, on the E side of Indre Flekkeroy 1 mile NNE of Fossevika, has several anchorages with depths of 13 to 25m over a general holding ground of mud and scattered patches of stone. An islet lying in the entrance to the inlet is conspicuous by the reason of the ruins of a fortress standing on it, and a white patch, resembling a house from a distance, marks the S wall of the fort. Berthing facilities with depths of 3 to 5m alongside, are available in the inlet.

1.14 Directions.—The seaward approach to Kristiansand lies on either side of **Ytre Flekkeroy** (58˚04'N., 8˚00'E.) and consists of a SW or secondary approach, passing W and N of the island, and a SE or main approach, passing E of the many dangers E and SE of the island. Both approaches are quite deep throughout but somewhat encumbered by dangerous submerged pinnacle rocks lying near the fairway. The SW approach is not recommended for larger vessels. A third approach leads through the several islands on the E side of Kristiansandsfjorden and forms a part of the inner passage available along much of the SE Norwegian coast.

Southeast approach.—The SE approach from sea is made between the numerous above and below water dangers extending SSW from Oksoy on the W side and similar dangers on the E side extending E from **Groningen** (58˚05'N., 8˚06'E.), a low islet, marked by a light, about 1 mile ENE of Oksoy. The channel is about 0.6 mile wide between Skipbaen, a rock which has a depth of 2.3m lying 0.175 mile E of Oksoy, and Langgrunn a submerged danger about 0.4 mile W of Groningen.

GRONINGEN LIGHTHOUSE FROM SW

Vessels are cautioned that Langgrunn seldom breaks and it should be given a wide berth particularly during heavy seas. It should be noted that Kristiansandsfjorden has a nearly constant outflow which tends to produce a set to the SW.

Kristiansand (58˚09'N., 8˚00'E.)

World Port Index No. 23550

1.15 Kristiansand lies on a low, sandy plain in a position about 5 miles inside the entrance to Kristiansandsfjorden and on the W side of the entrance to the river Torridalselv, where its contiguous harbor area is divided into two sections by the well-forested island of Odderoya. Vesterhavn, the W section, along with its SW extension Fiskabukta, is commonly used by commercial shipping and, because of its shelter, room, convenient depth, and easy access, is considered one of the finest natural harbors in Norway. There is sufficient space for a large number of vessels in the harbor.

Austerhavn, the E section, is open to the SE but is seldom used except as a quarantine anchorage. Both Vesterhavn and Austerhavn receive a heavy swell during periods when gale force winds blow from the S and SE.

Torridalselv reaches Kristiansandsfjorden at the river Otra. The channel can be navigated by small vessels, with a draft no greater than 3.7m, with local knowledge, however, proceed no farther upstream than the bridge joining Kristiansand with Lund.

Tides—Currents.—Tides in the harbor are negligible but a rise of 0.3m is referenced for spring tides. During storms, with strong S or W winds, tides may rise to 0.6m and strong N or E winds may produce a fall of a like amount.

Water flowing from the Otra empties into Austerhavn and produces a noticeable set onto the small islands on the NE side of Odderoya, but has little effect in the inner reaches of Austerhavn.

Ice is seldom a concern for shipping. In severe winters, from the middle of February to the beginning of March, it may become a hindrance, but never so great that icebreakers cannot keep the harbor open and clear.

Depths—Limitations.—The depths alongside the piers range from 4.9 to 18.3m. The ro-ro terminal has a depth of 9.1m alongside. The tanker bunker stations have two berths with depths of 9.4 and 10m. Vessels are restricted to a depth limitation of 10m and a maximum of 24,000 grt at the quays. Vessels of any size may enter the harbor.

1.16 Aspect.—Hogfjell (58˚04'N., 8˚00'E.), a hill 56m high standing on Yttre Flekkeroy, is surmounted by a radio mast.

Bukksteinen (58˚09'N., 7˚53'E.), about 3.5 miles W of Kristiansand, 205m high, is remarkable for its resemblance to a haystack; it is steep on its SW flank.

Duekniben, close W of Kristiansand, is a conspicuous conical hill.

Sotasen (58˚07'N., 8˚08'E.), 85m high, and Dolsveden, 109m high, about 4.5 miles ESE of Kristiansand, rise above the relatively low-lying islands on the E side of the entrance to Kristiansandsfjorden; they are particularly conspicuous from the SW.

Kosvikfjorden, an inlet about 2 miles E of Kristiansand, has anchorage in 22 to 28m, near the head of the inlet. Moderate sized vessels pass on either side of the awash rock **Tue** (58˚07'N., 8˚03'E.), and then proceed with caution to pass in

mid-channel between dangers narrowing the entrance to the inlet.

Pilotage.—Pilotage is compulsory for all non Norwegian ships, and is available via Oksoy Pilot Station. Contact is made on VHF channel 16 and 13, with a minimum of 2 hours notice. The Pilot boat is marked LOS on both sides. The pilot boards 2.5 miles ESE of Oksoy. There is no special anchorage area for a vessel awaiting a pilot. Pilots are available around the clock.

Regulations.—Bathing and surfing are permitted only at places specified in the harbor regulations. The use of firearms for hunting is not permitted in the harbor area.

Anchorage.—Vesterhavn and Fiskabukta have sheltered anchorage for large vessels in 22 to 42m, over a holding ground of mud, sand, and scattered patches of rock. Vessels without an assigned berth or subject to quarantine must anchor such that their swing into a SW wind will not carry them NE of a line between the W extremity of Dybingen and **Nordodden** (58˚08.3'N., 7˚58.6'E.) to the NW.

Austerhavn has indifferent anchorage for moderate-sized vessels in 13 to 36m, over a steeply sloped holding ground of mud, in a position near the head of the harbor.

Tovdalsfjorden (58˚07'N., 8˚03'E.)

1.17 Tovdalsfjorden, the continuance of Kristiansands-fjorden is, generally, quite deep throughout but is somewhat obstructed by off-lying rocks and by a partially drying and frequently shifting sand-bank which extends well out from the entrance to Tovdalselv.

A suspension bridge, with a vertical clearance of 30m spans the fairway about 1.25 miles within the entrance. A light is shown on either side of the bridge, at the center of the main fairway, which is close W of Haanesodden.

The inlet, with the exception of the portion below the suspension bridge, normally freezes over in winter. An attempt is usually made, however, to keep open a channel to Kjevik, just N of the entrance to Tovdalselv, where a 20m long concrete quay has a depth of 10m alongside.

Inlet currents are controlled by general weather conditions and directly influenced by water outflow from Tovdalselv. Tidal influence is minimal. During spring or after heavy snow fall, fresh water discharge from the river increases and sends a current flow N into Alefjaerfjorden, the extension of Tovdalsfjorden, and S along the W side of Tovdalsfjorden.

Marvika, a cove close N of Gleodden, the W entrance point of Tovdalsfjorden, is the site of a small naval station. Navigation and anchorage are prohibited within close vicinity of the cove.

Anchorage.—Tovdalsfjorden has general anchorage throughout, where depths are suitable, and there is a lay up anchorage within an area W of a line joining Gleodden with Varodden, which lies about 1 mile NNE at the W end of the bridge.

Kongsgardbukta, a small bay N of Gleodden within the lay up area, has good anchorage for small vessels with local knowledge, in 23 to 27m, mud. There are a number of mooring buoys in Kongsgardbukta. Vikebukta, close N of Kongsgardbukta, affords good anchorage for moderate sized vessels in depths of 12 to 15m, mud and clay. Vikebaen, a submerged rock with a depth of 1.5m, lies in the S approach to this anchorage. The E and W ends are each marked by an iron perch. There is a 6.8m patch in the middle of the entrance to a core between Ringknuteodden and Varodden.

Gjusvik, a small community fronting an inlet opposite the entrance to Tovdalselv, has an outer anchorage in 27 to 32m in a position N of the Oen island, and an inner anchorage in 10m NW of Oen island. Vessels proceeding to the inner anchorage by steering N of Oen and through a clear channel passing close S of the mainland point Skinnertangen and N of Gjusvikbaen, an awash rock, lying midway between Skinnertangen and the N extremity of Oen.

Kostolbukta, at the head of Alefjaerfjorden, has good anchorage for large vessels in about 33m, sand and mud.

Directions.—Vessels bound for the anchorages in Tovdalsfjorden or Alefjaerfjorden, steer to pass in mid-channel between **Kjerkebaen** (58˚08'N., 8˚02'E.), a submerged rock on the E side of the fairway, and Kuholmbaen, on the E side of the foul ground, 0.2 mile NNW, and proceed to the E side of the fjord and pass under the bridge. From the bridge continue in mid-channel, in deep water, to the head of Alefjaerfjorden. The channel is narrow between the sand-bank extending from the entrance to Tovdalselv and the dangers lying E of Oen; vessels should exercise prudence in this area.

Kristiansandsfjorden to Arendal

1.18 The coastline between Kristiansandsf-jorden and Ryvingen, an island near the S approach to Arendal, about 27 miles, is irregular with an uninterrupted series of coves, small bays and inlets of a generally moderate size throughout. Inland the terrain continues as a succession of low rocky hills and rolling plains which become more forested the greater the distance from the open sea. The land has a general light gray color as far as Homboroya, then shades into a dark gray between Homboroya and Grimstad, and finally becomes remarkably reddish for a distance of about 5 miles from Grimstad before returning to gray once more farther to the NE. Offshore, the coastline continues to be fronted by many islands, numerous islets, and a multitude of scattered awash and submerged rocks which, are generally barren and situated within 2 miles of the shore. In appearance, they tend to merge with the mainland background which is largely without distinguishing features save for Homborsundsfall and Grimstadsalen.

Offshore and inshore depths continue to be considerable. The 200m curve parallels the coast and lies between 2 to 4 miles seaward of offshore dangers, save near Kvasefjorden, where it closes to a distance of about 1 mile off the farthest seaward danger.

Kristiansandsfjorden to Store Kvalsholmen.—The coastal dangers extend about 7 miles in a general ENE direction from Groningen, in the entrance to Kristiansandsfjorden, to Store Kvalsholmen (58˚09'N., 8˚17'E.), an island lying 1 mile off the mainland. Offshore dangers lie up to 1.75 miles SE of Store Kvalsholmen.

1.19 **Randoysund** (58˚06'N., 8˚08'E.) is an inner passage which leads E from Kristiansandsfjorden to Kvasefjorden. The

channel is narrow and tortuous and in 1944 it was reported to be suitable for vessels with a draft up to 5m.

Randoysund is entered N of **Stokken** (58˚07'N., 8˚06'E.), the N part of Vestre Randoy; it separates Ostre Randoy and Torsoy from the mainland. The fairway is marked by lights, beacons, and buoys.

Mannevikodden Light is situated on the mainland about 0.2 mile N of the NW extremity of Ostre Randoy. There is a speed limit of 5 knots between Stokken and Mannevikodden lightstructures.

An overhead cable with a vertical clearance of 30m spans Randoysund between Stokken and the mainland.

There are a number of dangerous rocks in Randoysund. A 3m shoal patch lies 183m NW of Mannevikodden; it is marked by a buoy. Close S of the 3m shoal there is a rock with a depth of 2m, or less, and it is marked by a perch. A 4.9m patch lies on the N side of the fairway 0.2 mile NNW of the N extremity of Torsoy.

Vranesbukta (58˚07'N., 8˚07'W.) a cove on the N side of Randoysund, has two concrete quays with depths of 4 to 6m alongside. A concrete quay at a tank installation in the E part of the cove has a depth of 3m alongside.

Anchorage.—The N entrance to the passage between Vestre Randoy and Ostre Randoy has anchorage for small vessels in 20m, mud and clay, good holding ground.

Breivika, a small bay on the N side of Randoysund, has anchorage in 20m clay.

An area off the NW extremity of Torsoy has anchorage for small vessels in 20m, mud, good holding ground, clear of an underwater cable; the anchorage is exposed to SE winds.

1.20 Kvasefjorden is entered between **Stangodden Beacon** (58˚06'N., 8˚09'E.) and Ytre Ulvoy which lies 2 miles ENE. From its entrance the fjord continues N for about 3.5 miles. It is quite deep throughout but is largely encumbered by many off-lying awash and submerged dangers. A beacon stands on the S extremity of Ytre Ulvoy.

A line of dangers extends SSW from Ytre Ulvoy to Ytre Hausene, about 2 miles distant, on the E side of the approach to Kvasefjorden, and dangers extend about 2 miles SSE from Stangodden along the W side of the fairway.

Leidegrunn (58˚06'N., 8˚11'E.), with a least charted depth of 8.5m, lies 0.9 mile E of the E extremity of Torsoy. This and other dangers in the approach to Kvasefjorden may be seen on the chart.

Anchorage.—Large vessels can anchor near the head of Kvarenesfjorden, a bay on the W side of Kvasefjorden, about 1.5 miles within the entrance. Large vessels may also anchor in Dypingen, a narrow bay on the E side of the fjord. An uncharted hill stands on the E side of Dypingen; it is distinctive from the SW by reason of the steep slope on its W side.

Two submarine power cables, which carry direct current, are laid through the middle of Kvasefjorden, then SSE across the Skagerrak. These cables may cause magnetic compass deviation.

1.21 **Ulvoysund** (58˚07'N., 8˚13'E.) between Ytre Ulvoy and Indre Ulvoy, is very narrow and is only suitable for small vessels with local knowledge; it has a least depth of 4.6m. Two small quays in the channel have depths of 3 to 4m alongside.

The W entrance to the channel is foul and intricate.

Gamle Hellesund (58˚09'N., 8˚16'E.), is a small sheltered harbor area lying enclosed by the islands of Steinsoy and Sandoy to the N, and Grimsoy and Helleoy to the S. The inner harbor, between Steinsoy and Grimsoy, has depths ranging from 8 to 10m, clay bottom, but the S and best access, between Grimsoy and Helleoy, and the E access, between Sandoy and Helleoy, have depths of only 3.5m. An overhead cable, with a vertical clearance of 25m, spans the S access.

Approaches to Gamle Hellesund are numerous and generally quite deep throughout, particularly for the principal approaches, but a multitude of awash and submerged dangers, lying near the fairway, limit their use to small vessels with local knowledge. The principal approaches are: from the SW, between the mainland coast and off-lying islands; from the SE, either N or S of the islet Store Kvalsholmen; and from the NE, through off-lying submerged dangers and either N or S of Store Kvalsholmen.

An inner passage leads through the SW approach, S of Store Kvalsholmen and then exits by way of the NE approach.

Aspect.—Maerra (58˚12'N., 8˚11'E.) is a remarkable hill, 167m high, standing about 3 miles NW of Gamle Hellesund. Dynga, a rounded hill 45m high, stands on the mainland about 1 mile S of Gamle Hellesund.

1.22 **Anchorage.—**The N entrance to the narrow channel between **Nipe** (58˚07'N., 8˚15'E.) and Ramsoy, two islands near the entrance to Gamle Hellesund SW approach, has indifferent anchorage for small vessels in 5 to 15m, sand, in a position NW of an overhead cable which spans the channel with a vertical clearance of 15m.

Bjorvika, a small mainland cove N of Ramsoya, has anchorage in 16 to 20m, good holding ground. The E approach is clear in mid-channel, but the W side is fouled by an awash rock which limits swinging room and requires vessels to anchor with their sterns made fast ashore.

Lyngholmane, an islet group about 0.5 mile SSE of Gamle Hellesund, has restricted anchorage with little swinging room, in 10 to 12m, mud. Small vessels enter either from the S through the narrowed 8.7m deep passage Lyngholmsund, passing close E of the islet Jenholmen, or in mid-channel through a narrow 6.9m deep passage leading from the W.

The S entrance to the S access to Gamle Hellesund has anchorage for small vessels in 14.6m, sand and mud, in a position NW of the submerged rock Attefotsbaen.

The water area between Lyngholmane and Helleoy has anchorage for larger vessels in 7 to 29m, clay and sand. The best anchorage is in 29m, clay, in a position between Helleoy and Attefotsbaen. Farther to the E, the holding ground becomes rocky. Winds from the S send a noticeable swell into the anchorage.

Risholmfloa, between Lyngholmane and the island Risholmen, has good and roomy anchorage for larger vessels in 22 to 29m, clay, in a position closer to Risholmen. Farther W the holding ground becomes rocky. The better approach is from the N and E around Risholmen, which can be kept close aboard at a distance of about 50m.

The water area between Sandoy and Helleoy has anchorage in 8 to 10m, sand and clay, in a position clear of a mid-lying rocky ridge with the highest peak in the E part of Lyngholmane

bearing about 155˚ and open E of the NE extremity of Helleoy. Vessels with a draft no greater than 4m enter the anchorage through the narrow and much encumbered channel leading from the E. A submarine cable is laid W from the NW point of Helleoy.

1.23 Store Kvalsholmen to Lillesand.—The coast between Store Kvalsholmen and **Justoya** (58˚13'N., 8˚22'E.) a large island lying about 4 miles NE and along the SW approach to Lillesand, comprises an area consisting of a multitude of off-lying islands and a large number of narrow, winding mainland inlets. Isefjaefjorden, extending NNW from the vicinity of Gamle Hellesund, and Steindalsfjorden, farther NE, is the more extensive of the mainland inlets.

Useful landmarks from the offing are Roynevarden, 76m high situated 1.75 miles NNW of Store Kvalsholmen; **Varberget** (58˚12'N., 8˚16'E.), 1.25 miles N of Roynevarden; Videheia, about 0.7 mile E of Varberget; and Gladstadheia, 170m high, about 3 miles NNW of Videheia.

Kvanneid (58˚10'N., 8˚16'E.) has sheltered anchorage, with limited swinging room, in 18 to 20m, mud, in a position close N of the cairn standing on the islet Hogholmen.

To approach the anchorage, pass E of the submerged dangers **Sandsloa** (58˚08'N., 8˚20'E.), Roynevardegrunnen, and Eplehausen, which seldom breaks except during severe storms. Vessels should steer for the island group Kjeholmane on a heading of 319˚ and in range with the hill Roynevarden. When the vessel is NW of Eplehausen, proceed so as to pass between Svertingen and the cairn standing on **Tronderoyholmen** (58˚09'N., 8˚19'E.), about 0.3 mile E. When clear of the rocks NNW of the cairn, steer to pass E of Makholmen, 0.8 mile NNW of Tronderoyholmen, and N of the islet group Kjeholmane; then continue W to the anchorage.

Akeroyhavn (58˚10'N., 8˚19'E.), on the SE side of Akeroy, has good anchorage for vessels with local knowledge in depths of 16 to 18m, clay, but swinging room is limited for larger vessels. Akeroyhavn can be approached from the SW by steering to pass on the SW side of **Ostre Groninghausen** (58˚11'N., 8˚20'E.) and, then pass between Akeroy Light structure and Makrellbaen, awash and marked by an iron perch, 0.15 mile WSW; then through a narrow channel NW of Groningen. Care should be taken to avoid a submarine cable laid from Akeroy Light to Akeroyhavn.

Vessels bound for the E entrance to Akeroyhavn, and having cleared the submerged and awash rocks of Vestre Hellene, about 0.7 mile ENE of Akeroy Light structure, steer to transit the channel between Garpholmen and Smaholmane, keeping to the S side of the fairway, and continue on into the anchorage.

1.24 Brekkesto (58˚12'N., 8˚21'E.), 1.25 miles NE of Akeroyhavn, is a small community on the SW side of Justoya. There is an inner harbor, suitable only for small craft, and an outer harbor formed within a grouping of low, off-lying islands; the harbor is not sheltered from onshore winds.

Nodingen (58˚11'N., 8˚22'E.), a flat-topped islet lying 0.5 mile SSE of Justoya, is marked by a pyramid beacon.

Klubbholmen Beacon-tower, standing 0.25 mile N of Nodingen Beacon and at the N end of Klubbholmen, is 3m high.

Brekkesto Light is shown from Vrakholmskjaer which is located 183m NNW of Klubbholmen Beacon-tower.

An iron perch marks a rock awash 0.5 mile WNW of Brekkesto Light.

Vessels enroute to Brekkesto anchorage pass W of Hellene, several rocks awash 0.7 mile ENE of Nodingen, and then between Klubbholmen and Vrakholmskjaer. Klubbholmen lies 0.15 mile N of Nodingen and Vrakholmskjaer lies about the same distance N of Klubbholmen. From the narrow fairway between the above islets vessels continue on into the anchorage.

Anchorage.—Anchorage may be taken in 22 to 26m, sand and clay, in a position E of the islet Gaupholmen. This islet is marked by an iron perch and should be avoided. Care should also be taken to avoid a submarine cable laid between Brakkesto Light and the shore of Breakkesto 0.35 mile WNW.

Lillesand (58˚15'N., 8˚23'E.)

World Port Index No. 23570

1.25 Lillesand is a natural coastal harbor formed within a coastal bight which extends SSW to Justoya, and is bound by Skogeroy and several other islands and islets on the SE and E.

Tides—Currents.—Neither currents or tidal waters are especially noticeable in the harbor, which is also generally ice free in winter.

Depths—Limitations.—Depths in the approach are, in general, about 48m. There are three quays, Kokkonesquay, Langquay, and the Fosbackkaia with depths of 10m alongside. The lengths of these quays are 80m, 70m, and 50m respectively. The Langquay reduces its berth to 7m at its inner part. There are two berths with depths of 8 to 9m alongside that will accommodate vessels up to 2,000 dwt. A tanker lay up berth has a depth of 7.5m and will accommodate vessels to 130,000 dwt.

A sandbar in the center part of the harbor has depths of 11 to 13m; it shelves off on either side.

Aspect.—Useful landmarks in the approach to Lillesand are; Vetehia, situated on Justoya and previously mentioned; Lillesand church, which is yellow with a dark gray roof and a spire; Floresteinen an 82m high hill E of Lillesand; Hisasen, 242m high, situated about 4.5 miles NNE of Lillesand; and **Kruglevarden** (58˚15'N., 8˚31'E.) an uncharted hill in the N part of the island Homboroya, 4 miles E of Lillesand.

Pilotage.—The pilot station is at Oksoy Light in the E entrance to Kristiasandsfjorden; pilots are also available at Torungen Light, Arendal. The speed limit within the harbor area is 5 knots.

Anchorage.—There is good anchorage throughout Lillesand Havn in depths of 20 to 30m, sand and clay, good holding ground. Quarantine anchorage is in the NE part of the harbor.

1.26 Lillesand to Grimstad.—Grimstad lies about 8.5 miles NE of Lillesand. The area between Lillesand and **Bjoroy** (58˚17'N., 8˚33'E.), an island lying about 6 miles NE in the

approach to Grimstad, encompasses an area in which the coastline is typically indented by mainland inlets and fronted by numerous off-lying islands and isolated dangers. **Gjaeslingane** (58˚13'N., 8˚29'E.), 0.5 mile SE of Gasa, is the farthest danger offshore along this part of the coast.

A magnetic anomaly, amounting to a decrease of about 3˚ in variation, is reported to exist in an area about 1 mile WNW of Gasa light.

There are several anchorages suitable for small vessels, with local knowledge, among the islands and islets between Lillesand and **Homboroya** (58˚15'N., 8˚31'E.), 4 miles ENE.

Humlesund (58˚14'N., 8˚25'E.), a narrow strait between the islands Bergsoy and Humleoy, has an anchorage in the SW entrance. Small vessels approaching the anchorage from the SW follow the directions for entering Lillesand, and steer a NE course to pass in mid-channel between Bergsoy and Humleoy. Anchor in 7m, when clear of the dangers on the SE side of the fairway; the holding ground is good but is unsheltered from the winds. A rock blocks the NE approach to the anchorage. The N passage is wider and deeper but the S passage with a depth of 7m is more direct. Vessels seeking the NE entrance steer for a cairn on Havsteinen, 0.3 mile E of Humleoy, in range 293˚ with Lillesand church. When the vessel is clear of the dangers SE of Havsteinen steer to pass in mid-channel between that islet and the dangers lying 183m NE. When the vessel is clear of this narrow passage continue NW, on a mid-channel course to the E entrance of Humlesund.

1.27 Auesoy (58˚15'N., 8˚27'E.), about 1 mile NNE of Humleoy, lies in the entrance to Kaldvellfjorden. Sandvika, the water between Auesoy and Lyngholmen, 0.15 mile SSE, has good anchorage for small vessels in 20 to 30m, clay, with mooring rings. The harbor is spacious but is exposed to current when subject to a SW wind.

Bergkirken (58˚14'N., 8˚27'E.), marked by a cairn, lies 0.2 mile SSE of Lyngholmen. Vessels approach Sandvika with the cairn on Bergkirken bearing 009˚. When the cairn is about 0.15 mile distant steer NW to pass in mid-channel between Bergkirken and Fugleholmen, an islet 0.2 mile WNW. When clear of the islet bring the E extremity in range about 149˚, astern, with Gasa light and steer to the anchorage in Sandvika or continue into Kaldvellfjorden.

Kaldvellfjorden, an inlet extending into the mainland, is well marked, but quite narrow. It has a depth of 6m but because of the tight turns large vessels will have difficulty in navigating the sound. The shore on both sides is relatively high, and as a result the channel is difficult to follow; however, transit may be easier than it appears.

Kaldvellfjorden has several good anchorages for small vessels, clear of the submarine cables, laid across the central part.

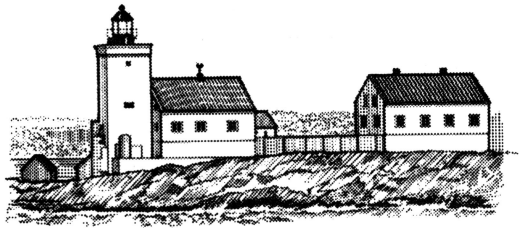
1.28 Kongholmane (58˚15'N., 8˚30'E.) is a group of several islets situated about 2 miles NNE of Gasa light. There is a good, calm harbor with swinging room, good holding ground of clay and sand, between Kongholmane and Homboroya about 0.25 mile ESE. The depths in the anchorage are from 20 to 35m.

Havnekilen (58˚16'N., 8˚31'E.) indents the coast of the mainland N of Homboroya. The inlet is relatively unencumbered and has anchorage for moderate sized vessels in 20m, clay, good holding ground, near the head of the bay; in other places the depth increases to 40m.

Several anchorages are available for small vessels, with local knowledge, in the area between Homboroya and the mainland; they may be approached from the SE and SW.

Vessels from SW having arrived in a position SE of Bergkirken, proceed NE to pass between Bergkirken and the partially awash, rocky patches Bergkirkegrunnane, and in mid-channel NW of the islet Rivingen. The fairway leads close off the SE side of Auesoy and NW Skjolden. Vessels steer NE keeping a mid-channel course and pass N of Kongholmane and into the desired anchorage.

RIVINGEN (58˚18.1'N., 08˚35.4'E.)



HOMBORSUND LIGHTHOUSE (58˚15.2'N., 08˚32.1'E.)

Rivingen Light (58˚18.1'N., 8˚35.4'E.) a disused lighthouse stands next to it.

Vessels from SE may approach the anchorages NW of Homboroya through the passages Homborsund and Djupesund.

Homborsund (58˚15'N., 8˚32'E.), formed between Homboroya and the islets Lille Gronnigen and Store Gronnigen, is easily recognized from sea by the beacon on the E extremity of Homboroya and the light which marks Store Gronnigen. The passage is narrow but clear and has a least depth of 18.9m in the fairway.

Currents always set seaward through the fairway. Djupesund, about 0.5 mile NW of Homborsund, is a narrow channel with a depth of 11.9m in mid-channel.

It is formed between the mainland point Havnespynten and the islet group Sundholmane about 46m SW. Havnespynten and Sundholmane are marked by lights.

The approach to Homborsund is made with the light on Havnespynten bearing 313˚; the track leads mid-channel between Homboroya and Lille and Store Gronnigen. When the

light ahead is about 0.2 mile distant steer NW and enter Djupesund; when clear of the channel steer either NE or SW to the anchorage, as desired.

1.29 Bufjorden (58˚17'N., 8˚32'E.) is a narrow, relatively deep and little encumbered inlet indenting the mainland in a position about 2 miles NNE of Homboroya. Two lesser inlets branch about 1 mile N from it.

The island **Bjoroy** (58˚17'N., 8˚33'E.), which rises to a height of 34m in the N part, forms part of the SE side of Bufjorden. A light is shown on the NE end of the island.

Vessels may approach Bufjorden with the SW side of Bjoroy in range with the hill Tjoresteinen, about 2 miles distant, on a bearing of 344˚. When abeam of Prestholmen, marked by a beacon, steer to pass W of the dangers extending SSW from Bjoroy, then steer N in a mid-channel direction to pass W of the rock that lies in the fairway SW of Bjoroy.

Strandfjorden, the E inlet on the N side of Bufjorden 0.45 mile NW of Bjoroy, has anchorage close within its entrance in 15.9m, clay and mud.

Anchorage may be taken in the SW part of Bufjorden in depths of 19m, mud, good holding ground. These anchorages are suitable for small vessels. In the vicinity of the anchorages, Bufjorden is about 183m wide.

Grosfjorden (58˚19'N., 8˚35'E.) extends about 2.25 miles NNE from a position about 1 mile NE of Bjoroy. The entrance to the fjord is narrow and encumbered by rocks, islets, and shoal water. Depths in the entrance are from 9.1 to 12.2m, further in the depths increase to 64m.

Grimstad, a summer resort, is situated in a cove on the W side of Grosfjorden at its head. Vikkilen, the continuation of Grosfjorden N of Grimstad, is relatively free of danger, and has depths up to 40m.

The SW and best approach to Grosfjorden is between Bjoroy and **Steinane** (58˚17'N., 8˚34'E.), about 0.4 mile SE.

1.30 Grimstad (58˚20'N., 8˚36'E.) is situated in a cove on the W side of Grosfjorden 3 miles NNE of Bjoroy. This small town has some light industry, mostly in connection with food products and boat building.

The harbor area lies N of a line joining Vessoyhodet light structure to the NW point of Indre Maloy, 0.3 mile E, then to Ulehodet, on the mainland 0.3 mile NE of Vessoyhodet; it includes Vikkilen for 1.5 miles NE of Grimstad.

Tides—Currents.—Tidal rise and fall is minimal; currents within the harbor are insignificant. Ice is generally negligible except during especially hard winters when the harbor may freeze over for short periods and require shipping lanes to be opened.

Depths—Limitations.—Depths in the entrance range from 9.1 to 12.2m; vessels with a draft of 9.1m can enter at all tides. Quays range up to 95m in length with alongside depths of 5 to 12m; there are ro-ro and container facilities. A shoal with a depth of 8.5m lies in the harbor close WSW of the light structure on Bieodden.

Aspect.—Useful landmarks are: Grimstad Church, yellow with a dark green roof and gray spire, particularly remarkable from the S; **Homborsundsfall** (58˚28'N., 8˚31'E.), about 8 miles NNW of Grimstad; the uncharted precipitous E slope of a lengthy mountain range, especially between the bearings of 327˚ and 011˚; **Drotningborg** (58˚21'N., 8˚39'E.) about 1.5 miles E of Grimstad, and an uncharted isolated large building.

Pilotage.—Pilotage should be requested through Arendal.

Anchorage.—Morvikkillen, 0.75 mile N of the light structure on Bjoroy, a narrow inlet, has good anchorage in 18 to 24m, sand, in a position nearer the head of the inlet. Vessels are exposed to S winds and secure their stern to mooring rings on the E shore.

Krakevika (58˚19'N., 8˚34'E.), a mainland bight on the W side of Grosfjorden, has anchorage in depths up to 30m, clay. The best approach to this anchorage is from W of Flaterivingen.

Klarodden, close N of Tvillingholmen, has anchorage for large vessels in 24m, good holding ground.

Gros (58˚20'N., 8˚35'E.), a community on the W side of Grosfjorden, is fronted by a water area that has good anchorage for large vessels in 20m. A rock with a depth of 11m lies in the entrance fairway.

Grimstad inner harbor has anchorage in 20m, mud, W of Bieodden.

Vikkilen has good anchorage anywhere clear of charted dangers in 13 to 30m, clay and ooze. Vessels in quarantine anchor in Vikkilen. Care must be taken to avoid rocks lying up to 183m off the W shore.

1.31 Grimstad to Arendal.—Hesnesbregen (58˚18'N., 8˚40'E.), a rock, awash and marked by a light, is situated 1.75 miles off the mainland, about 3.25 miles NE of Bjoroy. Innumerable passages to Grosfjorden lead through the islands and dangers to the W of Hesnesbregen, however, they are for use by small vessels with local knowledge.

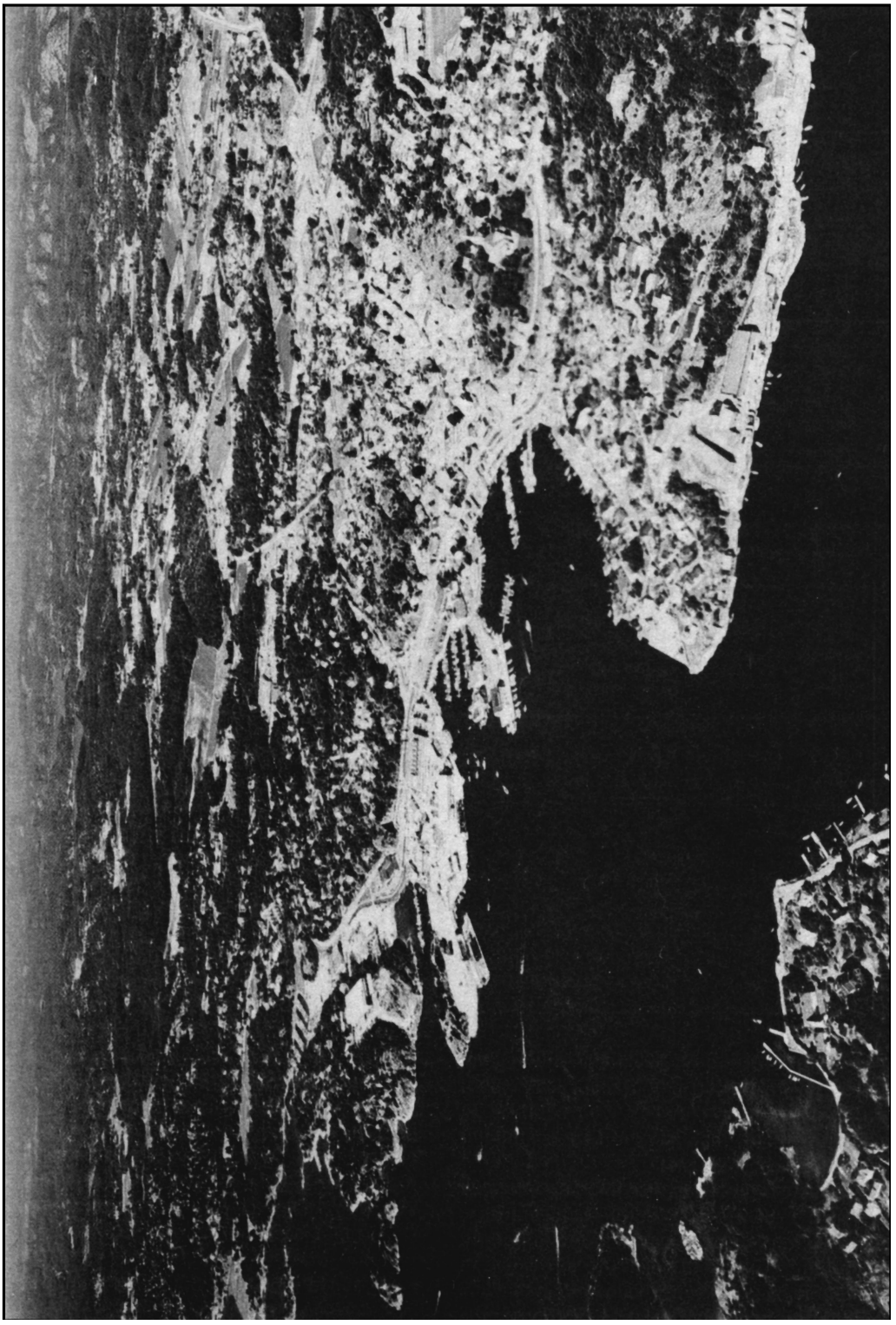
Caution.—As the outer dangers are steep-to, a good offing should be maintained in thick weather. There is often poor visibility during onshore winds, when a strong set toward land occurs in the vicinity of Tromoy, E of Arendal.

Grunnsletta (58˚17'N., 8˚37'E.) has an isolated shoal of 6m which lies 2.25 miles SW of Hesnesbregen Light. It is covered by the green sector of Stangholmen Light.

Hesnesoy and approaches.—Hesnesoy (58˚20'N., 8˚39'E.) lies close offshore 1.5 miles E of Grimstad. The island is comparatively low-lying but stands out against the striking red color of the mainland background, even during periods of poor visibility.

Hesnesoy and Kvaloy, close NE, are separated from the mainland by Hesnessundet, which is narrow with a least charted depth of 11m in the fairway. On the N side of Hesnesoy there is a very good harbor. Mooring rings are situated on shore below the buildings of the harbor, and rings are also situated on the small islet NW of the built up area.

An arc of off-lying islets and dangers extends E and then continues NNE from Hesnesoy into the S approaches to Arendal.



GRIMSTAD FROM NE

Numerous passages available to small vessels, with good local knowledge, lead through the off lying dangers extending NE from Hesnesoy. In addition to Hesnessundet, the passage Gamlegapet leads between Hesnesoy and the island group Valoyane; a channel leads between Valoyane and the dangers constituting Losserevet. There is a passage between Losserevet and the small island of Ryvingen and a passage between the dangers N of Ryvingen and the islets S of the small island of Ostre Sperrholmen. The inner passage continues from Hesnessundet in a general NE direction to the fairway between Ostre Sperrholmen and the cairn standing on the awash rock Svartskjaer.

1.32 Gamlegapet (58˚20'N., 8˚40'E.), the passage between Hesnesoy and Valoyane, is clear throughout and has a charted depth of 24m in the fairway.

Tonneholmen, an islet 6m high, is situated on the E side of the fairway, about 201m E of Hesnesoy; it is marked by a beacon.

Vessels approaching Gamlegapet, and having cleared Grundsletta, steer for the W extremity of Tonneholmen on a heading of 020˚ and in range with the hill Store Randvikberget, about 3 miles distant. This approach passes E of several rocks and about 0.35 mile W of the light on Hesnesbregen. When the S extremity of Hesnesoy is abeam, direct the course to port and steer a mid-channel course through Gamlegapet and then NE toward Fevik.

If the vessels which have passed through Gamlegapet are proceeding to the NE entrance of Hesnessundet they round Haholmen, off the NE extremity of Kvaloy, pass N of the rock, awash, N of Kvaloy and then proceed in mid-channel through the fairway.

Valoyane consists of several small islands surrounded on all sides, except the NW, by a number of small islets and rocks. A rock encumbered deep water arm of the sea separates the larger N island from the two smaller S islands. Hesnes beacon stands on the SW of the two smaller islands of Valoyane.

1.33 Fevikkilen (58˚22'N., 8˚41'E.), 1.5 miles NNE of Hesnesoy, has good anchorage for small vessels in 12 to 16m, mud and sand.

Vessels from the SW approaching Fevikkilen, having transited Gamlegapet, bring the lights on the NE extremity of Kvaloy in a range, astern, 227˚, and proceed to a position about 1 mile distant from the front light; a rocky patch with a depth of 4.6m lies close W of this position. From this point, steer 334˚, with the highest point of the hill Lauvasen ahead.

TORUNGEN LIGHTHOUSE (58˚23.8'N., 08˚47.9'E.)

Vessels with local knowledge may approach Fevikkilen by the passage between Valoyane and Losserevet. It should be noted that this passage has a width of about 46m between Sondre Torskebaen and a rock with a depth of 0.5m to the SW. In this approach, steer for the highest part of **Lauvasen** (58˚23'N., 8˚40'E.), bearing 334˚ and in range with the rock Hundeskjaer. When Hundeskjaer is about 0.6 mile distant, steer NNE to pass W of Losserevet, this leg of the track is good for about 1 mile, when the course should be directed to the W and pass in mid-channel between Sondre Torskebaen and the rock close SW. When the highest point of Lauvasen bears 334˚, steer on that course and pass in mid-channel into Fevikkilen.

Fevik (58˚23'N., 8˚42'E.) (World Port Index No. 23590) is a small community and popular summer resort lying in a cove at the head of Fevikkilen. There is regular communication by sea with Grimstad and Arendal.

Good anchorage can be obtained off Fevik by small vessels with local knowledge in depths of 12m, mud and sand. Care should be taken to avoid a 3.5m shoal lying off the E shore 0.3 mile NE of the light structure.

Table of Contents